

ation, therefore, being so soon interrupted, the string soon became so bad that it acted nothing better than common twine without a wire. I attempted to mend it by joining the broken pieces of wire, and working into the twine another wire, which proved a very laborious work, but the remedy had very little effect, the wire breaking again after the first trial, which determined me to adopt other methods, and, after several experiments I found that the best string was one which I made by twisting a copper thread<sup>1</sup> with two very thin threads of twine. Strings like this I have used for the greatest part of my experiments with the kite, and I find them to be exceedingly useful and fit for the purpose. Silver or gold threads would do much better to twist with the twine because they are much thinner than copper thread, and in consequence, the string would be much lighter, but at the same time it is to be considered that gold or silver thread is much dearer than copper thread.

I have attempted to render the twine a good conductor of electricity by covering it with conducting substances, as lamp black, powder of charcoal, very fine emery, and other substances, mixing them with diluted gum water; but this method improves the string very little, and for a short time, for the said conducting substances are soon rubbed off the twine. Mr. Nairne informed me that he used to soak the string of his electrical kite in a strong solution of salt, which rendered it a good conductor, so far as it attracted the moisture of the air. In consequence of this information I soaked in salt water a long piece of twine, and by raising a kite with it I found that it conducted the electricity pretty well, but I thought it much inferior to the above-described string with the copper thread, besides the salted string in wet weather not only leaves part of the salt upon the hands of the operator, and in consequence renders them unfit to manage the rest of the apparatus, but it marks a white spot wherever it touches the clothes.

In raising the kite when the weather is very cloudy and rainy, in which time there is fear of meeting with great quantity of electricity, I generally use, to hang upon the string, the hook of a chain, the other extremity of which falls upon the ground. Sometimes I use another caution besides, which is to stand upon an insulating stool, in which situation I think that if any great quantity of electricity, suddenly discharged by the clouds, strikes the kite, it can not much affect my person. As to insulated reels and such like instruments that some gentlemen have used to raise the kite without danger of receiving any shock, fit for the purpose as they may appear to be in theory, they are yet very inconvenient to be managed. Except the kite be raised in time of a thunderstorm, there is no great danger for the operator to receive any shock. Although I have raised my electrical kite hundreds of times without any caution whatever, I have very seldom received a few exceedingly slight shocks in my arms. In time of a thunderstorm, if the kite has not been raised before, I would not advise a person to raise it while the stormy clouds are just overhead, the danger in such time being very great, even with the precautions above mentioned. At that time, without raising the kite, the electricity of the clouds may be observed by a cork-ball electrometer held in the hand in an open place, or, if it rains, by my electrometer for the rain, which will be described hereafter.

The experiments made by Cavallo with the above kite are given in full from September 2, 1775, to January 8, 1777, from which we cull only the following: He demonstrates that it was the string and not the kite that collects the electricity from the air, and, again, that for the same length of string the index of his electrometer rose higher in proportion as the kite came nearer to the zenith, but the angular distance from the zenith is not given, so that we can not infer anything as to the angle of efficiency of his kites.

#### MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of Senor Mariano Bárcena, director, and Senor José Zendejas, vice-director, of the Central Meteorologico-Magnetic Observatory, the summaries of Mexican data for the months of January and February have been communicated in manuscript, in advance of their publication in the *Boletín Mensual*; an abstract translated into English measures is here given in continuation of the similar tables published in the MONTHLY WEATHER REVIEW during 1896. The altitudes occasionally differ from those heretofore published, but no reason has been assigned for these changes. The barometric means have not been reduced to standard gravity, but this correction will be given at some future date when the pressures are published on our Chart III.

<sup>1</sup> I mean such a thread of copper as is used for trimmings, etc., in imitation of gold threads, which are nothing more than silk or linen threads covered with a thin lamina of copper.

#### Mexican data for January, 1897.

| Stations.                  | Altitude. | Mean barometer. | Temperature. |       |       | Relative humidity. | Precipitation. | Prevailing direction. |          |
|----------------------------|-----------|-----------------|--------------|-------|-------|--------------------|----------------|-----------------------|----------|
|                            |           |                 | Max.         | Min.  | Mean. |                    |                | Wind.                 | Cloud.   |
| Aguascalientes .....       | 6,112     | 23.80           | 73.4         | 35.6  | 55.4  | 50                 | 4.72           | n.                    | sw.      |
| Campeche .....             | 1,663     | .....           | .....        | ..... | 73.2  | .....              | .....          | .....                 | .....    |
| Colima (Seminario) ..      | 1,112     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| Colima .....               | 112       | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| Guadalupe (O. d. E.) ..    | 5,141     | 24.98           | 79.9         | 34.2  | 57.7  | 86                 | 0.19           | n.w.                  | w.       |
| Guajuato .....             | 6,781     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| Jalapa .....               | 4,787     | 25.58           | 88.2         | 41.5  | 57.7  | 85                 | 2.98           | n.                    | .....    |
| Lagos (L. G.) .....        | 6,275     | 24.14           | 77.9         | 36.7  | 55.0  | 57                 | 0.63           | sw.                   | sw.      |
| Leon .....                 | 5,901     | 24.30           | 76.8         | 34.3  | 56.8  | 50                 | 0.50           | ssw.                  | sw.      |
| Magdalena (Sonora) ..      | 4,948     | .....           | .....        | ..... | 52.3  | .....              | 6.46           | s.                    | sw.      |
| Mazatlan .....             | 25        | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| Merida .....               | 50        | 30.01           | 91.2         | 54.5  | 72.0  | 74                 | 2.95           | ne.                   | se.      |
| Mexico (Obs. Cent.) ..     | 7,473     | 23.06           | 74.5         | 37.0  | 55.9  | 49                 | 0.15           | sw.                   | sw.      |
| Mexico (E. N. de S.) ..    | 7,480     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| Monterey .....             | 1,636     | 28.34           | 77.0         | 32.9  | 55.4  | 77                 | 1.44           | ne.                   | ne.      |
| Morelia (Seminario) ..     | 6,401     | 23.96           | 75.1         | 37.4  | 55.6  | 63                 | 0.72           | ssw.                  | w.       |
| Oaxaca .....               | 5,164     | 25.10           | 82.6         | 39.4  | 63.3  | 56                 | T.             | nw.                   | .....    |
| Pabellon .....             | 6,312     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| Pachuca .....              | 7,956     | 22.54           | 80.2         | 34.9  | 54.0  | 59                 | 0.22           | nne.                  | sw.      |
| Puebla (Col. d. Est.) ..   | 7,118     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| Puebla (Col. Cat.) .....   | 7,112     | 23.38           | 76.1         | 39.9  | 56.8  | 46                 | 0.04           | ese.                  | sw.      |
| Queretaro .....            | 6,070     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| Real del Monte .....       | 9,085     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| Saltillo (Col. S. Juan) .. | 5,377     | 24.89           | 74.8         | 31.3  | 50.4  | 67                 | 3.66           | n.                    | n.       |
| San Jacinto (E. N. d. A.)  | 7,438     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| San Luis Potosí .....      | 6,302     | 24.18           | 73.0         | 37.4  | 54.1  | 68                 | 1.04           | sw.                   | w.       |
| Silao .....                | 6,063     | 24.28           | 72.7         | 44.8  | 59.0  | 62                 | 0.44           | .....                 | .....    |
| Tacámbaro .....            | 7,630     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| Tacubaya (Obs. Nac.) ..    | 88        | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| Tampico (Hos. Mil.) ..     | 5,458     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| Tehuacan .....             | 5,812     | 21.89           | 71.4         | 31.6  | 50.2  | 54                 | 0.82           | se.                   | .....    |
| Toluca .....               | 6,011     | .....           | .....        | ..... | ..... | .....              | 0.46           | .....                 | .....    |
| Trejo (H. d. S., Gto.) ..  | 6,011     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| Trinidad .....             | 48        | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |
| Veracruz .....             | 8,015     | 23.49           | 75.2         | 29.8  | 51.8  | 52                 | 1.24           | sw.                   | sw.      |
| Zacatecas .....            | 5,125     | 25.08           | 80.6         | 44.4  | 62.4  | 62                 | 0.42           | se.                   | sw., se. |
| Zapotlan (Seminario) ..    | .....     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....    |

\*Trejo appears to have the same altitude as the next station, Trinidad, but this may be a typographical error as in the December *Boletín*. See MONTHLY WEATHER REVIEW, January, 1897, page 17.

†Trinidad is 14 kilometers east-southeast of Leon.

#### Mexican data for February, 1897.

| Stations.                  | Altitude. | Mean barometer. | Temperature. |       |       | Relative humidity. | Precipitation. | Prevailing direction. |        |
|----------------------------|-----------|-----------------|--------------|-------|-------|--------------------|----------------|-----------------------|--------|
|                            |           |                 | Max.         | Min.  | Mean. |                    |                | Wind.                 | Cloud. |
| Aguascalientes .....       | 6,112     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |
| Campeche .....             | 1,663     | 28.29           | 96.4         | 46.8  | 72.1  | 61                 | 0.08           | wsu.                  | sw.    |
| Colima (Seminario) ..      | 1,112     | 29.81           | 90.1         | 50.0  | 60.7  | 58                 | 0.00           | .....                 | .....  |
| Colima .....               | 112       | 24.98           | 87.3         | 35.8  | 62.4  | 79                 | 0.00           | sw.                   | sw.    |
| Guadalupe (O. d. E.) ..    | 5,141     | 24.98           | 87.3         | 35.8  | 62.4  | 79                 | 0.00           | sw.                   | sw.    |
| Guajuato .....             | 6,781     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |
| Jalapa .....               | 4,787     | 25.52           | 77.0         | 55.4  | 64.6  | 72                 | 0.72           | se.                   | .....  |
| Lagos (L. G.) .....        | 6,275     | 24.13           | 87.8         | 30.2  | 59.0  | 48                 | T.             | nw.                   | sw.    |
| Leon .....                 | 5,901     | 24.29           | 84.2         | 34.7  | 60.4  | 36                 | T.             | sw.                   | sw.    |
| Magdalena (Sonora) ..      | 4,948     | .....           | .....        | ..... | 54.9  | .....              | 0.24           | n.                    | n.     |
| Mazatlan .....             | 25        | 29.96           | 77.4         | 54.9  | 69.8  | 70                 | 0.00           | nw.                   | sw.    |
| Merida .....               | 50        | 30.94           | 95.2         | 53.6  | 77.0  | 70                 | 0.08           | se.                   | se.    |
| Mexico (Obs. Cent.) ..     | 7,473     | 23.06           | 73.9         | 46.9  | 60.1  | 41                 | 0.00           | se.                   | sw.    |
| Mexico (E. N. de S.) ..    | 7,480     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |
| Monterey .....             | 1,636     | 28.09           | 95.0         | 41.0  | 65.8  | 59                 | T.             | ne.                   | ne.    |
| Morelia (Seminario) ..     | 6,401     | 23.96           | 85.8         | 38.5  | 61.9  | 52                 | 0.00           | ssw.                  | wsu.   |
| Oaxaca .....               | 5,164     | 25.06           | 90.0         | 42.2  | 67.5  | 55                 | 0.00           | nw.                   | ne.    |
| Pabellon .....             | 6,312     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |
| Pachuca .....              | 7,956     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |
| Progreso .....             | .....     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |
| Puebla (Col. d. Est.) ..   | 7,118     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |
| Puebla (Col. Cat.) .....   | 7,112     | 23.37           | 83.3         | 38.8  | 61.0  | 44                 | 0.00           | e.                    | sw.    |
| Queretaro .....            | 6,070     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |
| Real del Monte .....       | 9,085     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |
| Saltillo (Col. S. Juan) .. | 5,377     | 24.78           | 85.9         | 37.7  | 58.3  | 50                 | 0.04           | s.                    | sw.    |
| San Jacinto (E. N. d. A.)  | 7,438     | 23.05           | 72.1         | 37.8  | 59.5  | 47                 | 0.00           | sw.                   | n. w.  |
| San Luis Potosí .....      | 6,302     | 24.11           | 81.5         | 39.6  | 60.8  | 63                 | T.             | sw.                   | sw.    |
| Silao .....                | 6,063     | 24.28           | 79.7         | 43.3  | 62.8  | 50                 | T.             | nw.                   | sw.    |
| Tacámbaro .....            | 7,630     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |
| Tacubaya (Obs. Nac.) ..    | 88        | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |
| Tampico (Hos. Mil.) ..     | 5,458     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |
| Tehuacan .....             | 5,812     | 21.93           | 76.6         | 28.6  | 54.5  | 49                 | 0.00           | sw.                   | .....  |
| Toluca .....               | 6,011     | .....           | .....        | ..... | ..... | .....              | 0.00           | .....                 | .....  |
| Trejo (H. d. S., Gto.) ..  | 6,011     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |
| Trinidad .....             | 48        | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |
| Veracruz .....             | 8,015     | 23.50           | 68.5         | 42.3  | 55.6  | 42                 | 0.00           | sw.                   | .....  |
| Zacatecas .....            | 5,125     | 25.08           | 87.4         | 43.5  | 65.1  | 48                 | 0.05           | ssw.                  | sw.    |
| Zapotlan (Seminario) ..    | .....     | .....           | .....        | ..... | ..... | .....              | .....          | .....                 | .....  |

#### CHEMICAL COMPOSITION OF THE UPPER AIR.

The second series of simultaneous balloon ascensions in the interest of meteorology was carried out on the 18th of February. The balloon, L'Aerophile, which ascended at